



NSAI
Standards

Irish Standard
I.S. EN 60904-1-1:2017

Photovoltaic devices - Part 1-1: Measurement of current-voltage characteristics of multi-junction photovoltaic (PV) devices

I.S. EN 60904-1-1:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

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NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

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National Foreword

I.S. EN 60904-1-1:2017 is the adopted Irish version of the European Document EN 60904-1-1:2017, Photovoltaic devices - Part 1-1: Measurement of current-voltage characteristics of multi-junction photovoltaic (PV) devices

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EUROPEAN STANDARD

EN 60904-1-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2017

ICS 27.160

English Version

Photovoltaic devices -
Part 1-1: Measurement of current-voltage characteristics of
multi-junction photovoltaic (PV) devices
(IEC 60904-1-1:2017)

Dispositifs photovoltaïques -
Partie 1-1: Mesurage des caractéristiques courant-tension des
dispositifs photovoltaïques (PV) multijonctions
(IEC 60904-1-1:2017)

Photovoltaische Einrichtungen -
Teil 1-1: Messen der Strom-/Spannungskennlinien von
photovoltaischen (PV) Einrichtungen mit Mehrschichtsolarellen
(IEC 60904-1-1:2017)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 60904-1-1:2017

European foreword

The text of document 82/1254/FDIS, future edition 1 of IEC 60904-1-1, prepared by IEC/TC 82 "Solar photovoltaic energy systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60904-1-1:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-03-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-06-22

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60891	-	Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics	EN 60891	-
IEC 60904-1	-	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics	EN 60904-1	-
IEC 60904-2	-	Photovoltaic devices - Part 2: Requirements for photovoltaic reference devices	EN 60904-2	-
IEC 60904-3	-	Photovoltaic devices - Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data	EN 60904-3	-
IEC 60904-4	-	Photovoltaic devices - Part 4: Reference solar devices - Procedures for establishing calibration traceability	EN 60904-4	-
IEC 60904-7	-	Photovoltaic devices - Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices	EN 60904-7	-
IEC 60904-8	-	Photovoltaic devices - Part 8: Measurement of spectral responsivity of a photovoltaic (PV) device	EN 60904-8	-
IEC 60904-8-1	-	Photovoltaic devices - Part 8-1: Measurement of spectral responsivity of multi-junction photovoltaic (PV) devices	EN 60904-8-1	-
IEC 60904-9	-	Photovoltaic devices - Part 9: Solar simulator performance requirements	EN 60904-9	-
IEC/TS 61836	-	Solar photovoltaic energy systems - Terms, definitions and symbols	-	-

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IEC 60904-1-1

Edition 1.0 2017-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Photovoltaic devices –
Part 1-1: Measurement of current-voltage characteristics of multi-junction
photovoltaic (PV) devices**

**Dispositifs photovoltaïques –
Partie 1-1: Mesurage des caractéristiques courant-tension des dispositifs
photovoltaïques (PV) multijonctions**





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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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IEC 60904-1-1

Edition 1.0 2017-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Photovoltaic devices –
Part 1-1: Measurement of current-voltage characteristics of multi-junction
photovoltaic (PV) devices**

**Dispositifs photovoltaïques –
Partie 1-1: Mesurage des caractéristiques courant-tension des dispositifs
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PHOTOVOLTAIC DEVICES –

**Part 1-1: Measurement of current-voltage characteristics
of multi-junction photovoltaic (PV) devices**

FOREWORD

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International Standard IEC 60904-1-1 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
82/1254/FDIS	82/1272/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60904 series, published under the general title *Photovoltaic devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

PHOTOVOLTAIC DEVICES –

Part 1-1: Measurement of current-voltage characteristics of multi-junction photovoltaic (PV) devices

1 Scope

This part of IEC 60904 describes procedures for the measurement of the current-voltage characteristics of multi-junction photovoltaic devices in natural or simulated sunlight. It is applicable to single PV cells, sub-assemblies of such cells or entire PV modules. It is principally intended for non-concentrating devices, but parts may be applicable also to concentrating multi-junction PV devices. An essential prerequisite is the spectral responsivity of the multi-junction devices, whose measurement is covered by IEC 60904-8-1.

The requirements for measurement of current-voltage characteristics of single-junction PV devices are covered by IEC 60904-1 whereas this document describes the additional requirements for the measurement of current-voltage characteristics of multi-junction PV devices.

This document may be applicable to PV devices designed for use under concentrated irradiation if they are measured without the optics for concentration and irradiated using direct normal irradiance and a mismatch correction with respect to a direct normal reference spectral irradiance distribution is performed. The reference spectral irradiance distribution is provided in IEC 60904-3

2 Normative references

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IEC 60904-1, *Photovoltaic devices – Part 1: Measurement of photovoltaic current-voltage characteristics*

IEC 60904-2, *Photovoltaic devices – Part 2: Requirements for photovoltaic reference devices*

IEC 60904-3, *Photovoltaic devices – Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data*

IEC 60904-4, *Photovoltaic devices – Part 4: Reference solar devices – Procedures for establishing calibration traceability*

IEC 60904-7, *Photovoltaic devices – Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices*

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